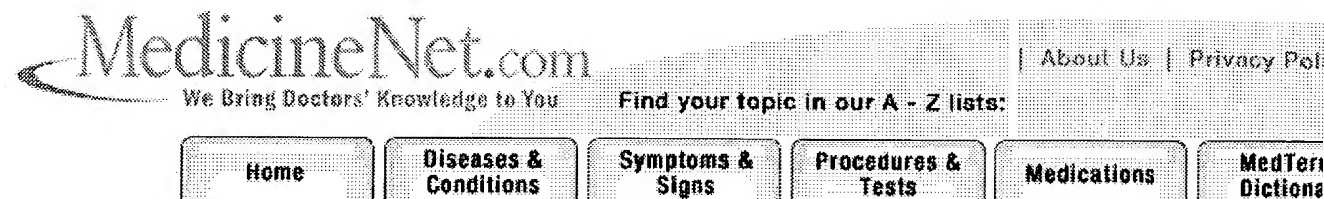


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Coronary Balloon Angioplasty (PTCA)

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What is balloon angioplasty?

Balloon angioplasty of the coronary artery, or percutaneous transluminal coronary angioplasty (PTCA), is a relatively new procedure introduced in the late 1970's. PTCA is a non-surgical procedure that relieves narrowing and obstruction of the arteries to the muscle of the heart (coronary arteries). This allows more blood and oxygen to be delivered to the heart muscle. PTCA is accomplished with a small balloon catheter inserted into an artery in the groin or arm, and advanced to the narrowing in the coronary artery. The balloon is then inflated to enlarge the narrowing in the artery. When successful, PTCA can relieve chest pain of angina, improve the prognosis of patients with unstable angina, and minimize or stop a heart attack without having the patient undergo open heart coronary artery bypass graft (CABG) surgery.

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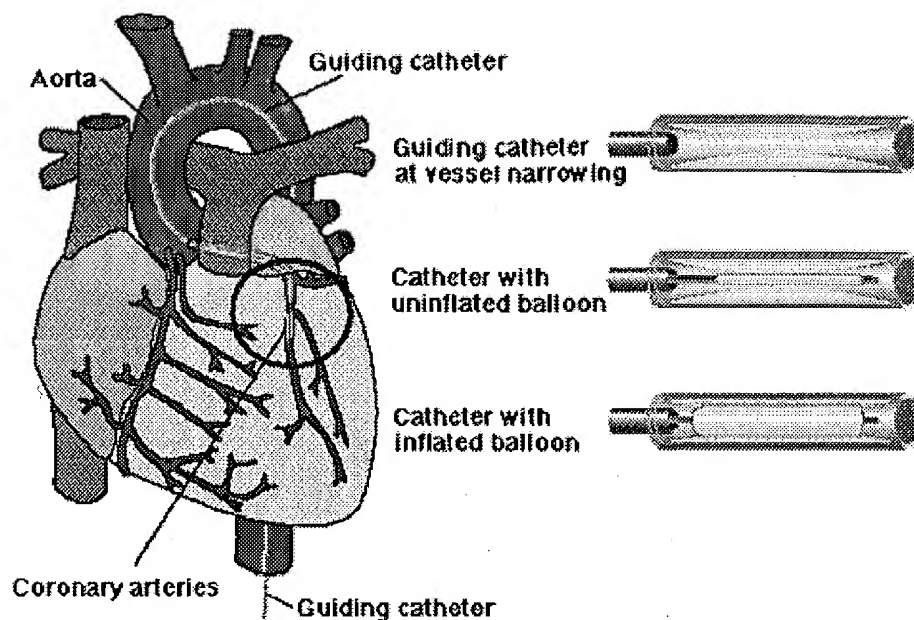
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BALLOON ANGIOPLASTY

In addition to the use of simple balloon angioplasty, the availability of stainless steel stents, in a wire-mesh design, have expanded the spectrum of patients suitable for PTCA, as well as enhanced the safety and long-term results of the procedure. Various "atherectomy" (plaque removal) devices are also available as adjuncts to PTCA. These include the use of the *excimer laser* for photoablation of plaque, *rotational atherectomy* (use of a high-speed diamond-encrusted drill) for mechanical ablation of plaque, and *directional atherectomy* for cutting and removal of plaque.

How does coronary artery disease develop?

Arteries that supply blood and oxygen to the heart muscles are called coronary arteries. Coronary artery disease (CAD) occurs when cholesterol plaque (a hard, thick substance comprised of varying amounts of cholesterol, calcium, muscle cells, and connective tissue, which accumulates locally in the artery walls) builds up in the walls of these arteries, a process called arteriosclerosis. Over time, arteriosclerosis causes significant narrowing of one or more coronary arteries. When coronary arteries narrow more than 50 to 70%, the blood supply beyond the plaque becomes inadequate to meet the increased oxygen demand during exercise. Lack of oxygen (ischemia) in the heart muscle causes chest pain (angina) in most patients. However, some 25% of patients experience no chest pain at all despite documented ischemia, or may only develop episodic shortness of breath instead of chest pain. These patients have silent angina and have the same risk of heart attack as those with angina. When arteries are narrowed in excess of 90-99%, patients often have angina at rest (unstable angina). When a blood clot (thrombus) forms on the plaque, the artery may become completely blocked, causing death of a part of the heart muscles (heart attack, or *myocardial infarction*).

The arteriosclerotic process can be accelerated by smoking, high blood pressure, elevated cholesterol and diabetes. Patients are also at higher risk for arteriosclerosis if they are older (greater than 45 years for men and 55 years for women) or if they have a positive family history of coronary heart disease.

How is coronary artery disease diagnosed?

The resting electrocardiogram (EKG) is a recording of the electrical activity of the heart, and can show changes indicative of ischemia or heart attack. Often, the EKG in patients with coronary artery disease is normal at rest, and only becomes abnormal when heart muscle ischemia is brought on by exertion. Therefore, exercise treadmill or bicycle testing (stress tests) are useful screening tests for patients with significant coronary artery disease (CAD) and a normal resting EKG. These stress tests are 60 to 70% accurate in diagnosing significant CAD.

If the stress tests are not diagnostic, a nuclear agent (cardiolite or thallium) can be given intravenously during stress tests. Addition of one of these agents allows imaging of the blood flow to different regions of the heart, using an external camera. An area of the heart with reduced blood flow during exercise, but normal blood flow at rest, signifies substantial artery narrowing in that region.

Stress echocardiography combines echocardiography (ultrasound imaging of the heart muscle) with exercise stress testing. It is also an accurate technique for detecting CAD. When a significant narrowing exists, the heart muscle supplied by the narrowed artery does not contract as well as the rest of the heart muscle. Stress echocardiography and thallium stress tests are 80% to 85% accurate in detecting significant CAD.

When a patient cannot undergo an exercise stress test because of neurological or arthritic difficulties, medications can be injected intravenously to simulate the stress on the heart normally brought on by exercise. Heart imaging can be performed with either a nuclear camera or echocardiography.

Cardiac catheterization with angiography (coronary arteriography) is a technique that allows x-ray pictures to be taken of the coronary arteries. It is the most accurate test to detect coronary artery narrowing. Small hollow plastic tubes (catheters) are advanced under x-ray guidance to the openings of coronary arteries. Iodine contrast "dye," is then injected into the arteries while an x-ray video is recorded. Coronary arteriography gives the doctor a picture of the location and severity of narrowed artery segments. This information is important in helping the doctor select medications, PTCA, or coronary artery bypass graft surgery (CABG) as the preferred treatment option.

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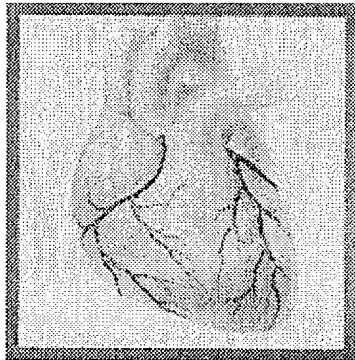
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Percutaneous Transluminal Coronary Angioplasty / Stent

Introduction

More premature deaths are caused by coronary artery disease than by any other cause in America. Coronary artery disease is the narrowing or obstruction of the vessels that supply oxygen to the heart muscle. This narrowing is caused by fatty deposits (plaque) on the walls of the arteries.

These fatty deposits gradually build up and can cause a marked reduction of blood and oxygen to the heart. If the blood flow is significantly reduced, some form of medical treatment becomes necessary. The picture on the right shows a diseased LAD artery.



One of the most common non-surgical treatments for opening obstructed coronary arteries is Percutaneous Transluminal Coronary Angioplasty (PTCA). The name itself says the procedure:

Percutaneous means access to the blood vessel is made through the skin

Transluminal means the procedure is performed within the blood vessel

Coronary specifies that the coronary artery is being treated

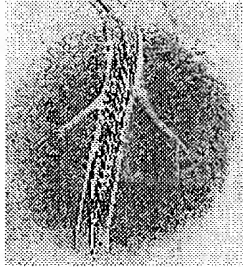
Angioplasty means "to reshape" the blood vessel (with balloon inflation). Also referred to as "angioplasty" because special balloons are used to open up obstructed arteries, this procedure sometimes also involves the use of devices known as "stents" to help keep the artery open.

The illustration on the right shows how a balloon catheter works to open an occluded artery.



Should you have any questions contact our office via [e-mail](#) or call 713-529-5530

Below, on the left, is an illustration of a special catheter being used to install a stent upon in advance by you and your physician, the diagnostic cardiac catheterization are done together. This is an added convenience for you as it shortens your hospital stay.



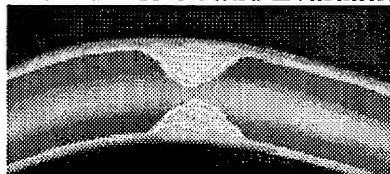
The picture on the right shows the diseased LAD pictured above after it has undergone a successful PTCA procedure in which a stent was installed.



Following is a description of the PTCA procedure. We hope to answer some of the questions you may have. However, it is important for you to realize that everyone's situation may be different. Your actual experience may vary slightly from what you read on the following pages. If you have any questions or doubts, please contact us or your physician.

PTCA/Stent Procedure

Pre-Admission and Evaluation



You will first undergo a thorough evaluation by your physician. You will have many questions you still have before your procedure begins. You may be permitted to drink clear liquids in the days leading up to the procedure. However, this should be cleared with your physician. Otherwise, food and beverages may be withheld after midnight. If you are a diabetic, you will receive special instructions. Your groin area will be washed and shaved in preparation for the procedure.

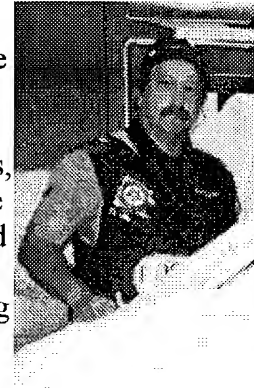
Angioplasty Procedure

If family or friends are with you, they will wait in the waiting room near the catheterization laboratory. The length of the procedure depends on the complexity of each individual's situation. The duration is between 1 and 2 hours.

An intravenous line will be started in your arm this morning. You will receive medications through this line. To help you relax, you will be given medication.

for the lab. You will remain awake, but slightly drowsy.

You will be placed on an x-ray table upon your arrival in the lab. It is the same type of room in which you had your cardiac catheterization. All personnel in the lab will be wearing surgical attire. You will be covered by sterile sheets, and so will some of the equipment. Your groin (arm) will be cleansed with an antiseptic (might be cold) and then numbed with an anesthetic. You will feel the sting of the needle, but then your groin (arm) will feel quite numb. Heart monitoring equipment will be placed on your arms and legs, and you may be given oxygen to breathe. You will be given certain medications through the intravenous line, and periodically medication will be given to relax you and decrease any restlessness. Remember, talk and follow directions.



The angioplasty catheter (balloon-tipped) is inserted at the numb area, and advanced to your heart, using x-ray to guide it. When the balloon is inflated at the point of the blockage, you may feel chest pressure, or discomfort, and this is normal. It will subside when the balloon is deflated. You may also feel your heart thump or skip, feel flushed, or have a headache. All these sensations are normal. You will be asked at times to hold your breath for a few seconds. You may also be asked to cough.

After the procedure, you will be moved to a recovery area for a short time, and then taken to your room where your heart can be monitored. Nurses will closely monitor your vital signs and general well being. They will also frequently check the groin area and dressing. A small, flexible catheter is routinely left in the groin for 4-6 hours unless a percutaneous suture is used to close the hole. You will be required to remain in bed and keep your leg immobilized.

You will be able to eat as soon as you wish after the procedure.

Recuperation

The catheter or sheath will be removed approximately 4-6 hours after the procedure. This period is crucial as the physician uses blood-thinning agents to implant the stent, be removed until the blood thinning reverted back to normal and firm pressure applied for a minutes. Then a pressure bandage is applied and a small sandbag placed over it. healing of the artery. Pain medication is available to you every few hours after your nurse know of any pain or discomfort you may feel at any time. The rest of rest, recuperation, and a gradual return to your activities.



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Discharge

Your doctor will see you the morning of discharge. Your doctor's nurse will go over your activities, and follow-up care. You will receive prescriptions for medicines you will usually undergo a low-level stress test very shortly after your discharge.

POSSIBLE COMPLICATIONS AND RISK

No invasive procedure occurs without a certain amount of potential risk and is followed closely by your doctor and nurses, precisely for the reason that if any arise, corrective action can be taken immediately. The incidence of complication you need to be aware what they can be:

1. Severe bruising/bleeding into the groin area of the procedure leg.
 2. Changes in your heart rhythm.
 3. Allergic reaction to the contrast or dye or to other medications used.
 4. A tear in the lining of the artery which is being dilated.
 5. Possibility of a heart attack during or following inflation of the balloon or if you are given strong blood thinners to minimize this risk.)
 6. Possibility of a blood clot in the artery in which the catheter is inserted. (If removal may be required.)
-

Follow-up Care

Periodic follow-up with your personal physician is quite important. It is important by angioplasty (PTCA), your immediate problem has been taken care of, but it is an artery disease. In some patients, re-narrowing (Restenosis) of the artery may occur months. If this happens, your original symptoms may return, or your stress test will

If you have chest discomfort, stop your activity, sit or lie down, and take nitroglycerin. If the chest discomfort does not go away after 3 nitroglycerin tablets in a 15 minute period, **DELAY SEEKING MEDICAL ATTENTION.** Either call your doctor, or go to the nearest hospital.

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